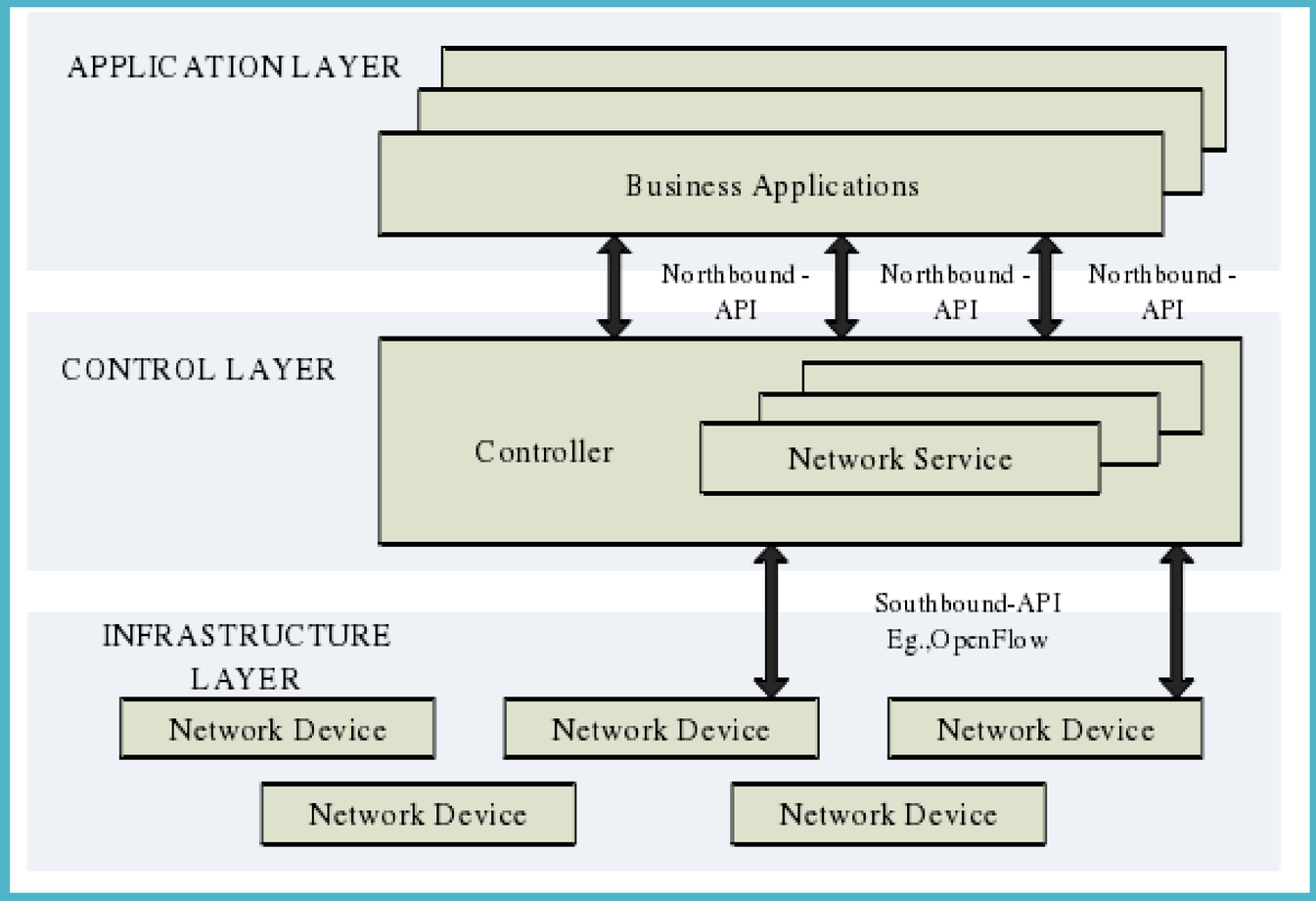
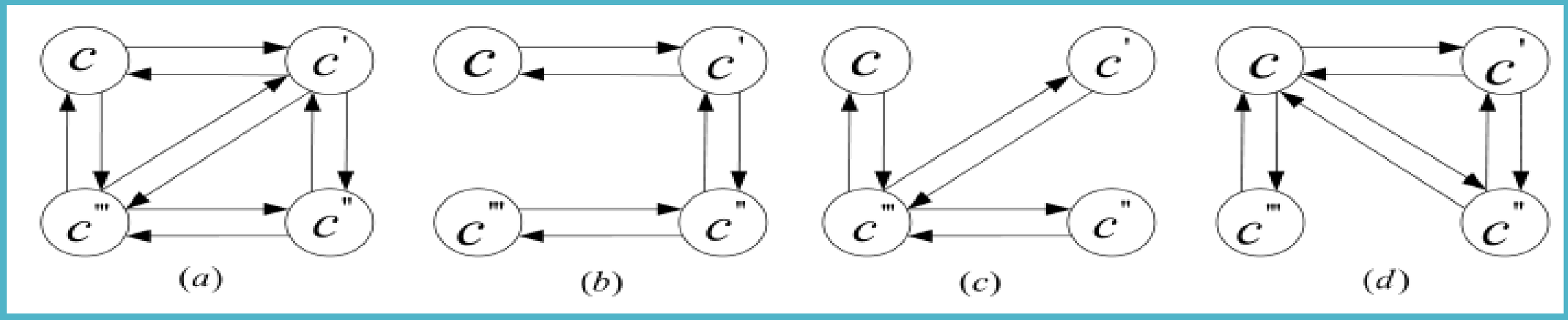
Design of Distributed Cache System in SDN Controller Cluster Based on Topology Partition

Wei Jiang[1, a], Fei Xia[2, b], Hui Liu[3, c], Jun Yu[3, d]
[1]Department of Energy Internet, State Grid Corporation of China, Beijing, 100031, China
[2]Information & Telecommunication Branch, State Grid Jiangsu Electric Power Co. Ltd, Nanjing 211100, China
[3]State Grid Electric Power Research Institute (SGEPRI), Nanjing 211100, China
[a]wei-jiang@sgcc.com.cn, [b]xiafei@js.sgcc.com.cn, [c]liuhui7@sgepri.sgcc.com.cn, [d]yujun@sgepri.sgcc.com.cn

***Abstract*—With the rapid development of cloud computing and virtualization technology, the scale of data center is expanding constantly. SDN controller is responsible for managing data center equipment, so the scale of controller cluster is expanding constantly. In this paper, an SDN multi-controller deployment method based on topology partition is proposed. By analyzing the consistent hashing algorithm, a data distribution mode based on the consistent hashing algorithm of virtual nodes is designed, and a set of communication protocols is developed under this data distribution mode to cache the communication between nodes. Experiments show that the proposed optimization and improvement scheme can effectively improve the performance of cache system and solve the problems of scalability, data inconsistency, serialization and cache distribution.**





CONCLUSION

At present, the data center usually uses SDN controller cluster for deployment and operation, but there are many business scenarios in the data center that will generate a large number of highly concurrent requests, which have high requirements for data processing. The introduction of distributed cache is to solve the problem of high concurrency. This paper introduces a distributed caching strategy, which distributes files in the network to helper nodes with caching function by running distributed caching algorithm. A distributed data cache system with redundant data backup and failure recovery mechanism is designed and implemented. The experimental test shows that the response speed of the segment-based consistent hash algorithm is 25% faster than the default, regardless of the cache reading or cache writing. The hash algorithm used is Murmurhash algorithm, which improves the hash speed to some extent.It shows that the network efficiency of the cache system meets the practical requirements.